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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/712,690  | 11/13/2003  | Ling Chen            | 006766/CPI/L/B/PJS  | 9100             |
| 44257   | 7590        | 05/25/2006           | EXAMINER            |                  |
| PATTERSON & SHERIDAN, LLP<br>3040 POST OAK BOULEVARD, SUITE 1500<br>HOUSTON, TX 77056 |             |                      | ZERVIGON, RUDY      |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 1763                |                  |

DATE MAILED: 05/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 10/712,690             | CHEN ET AL.         |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | Rudy Zervigon          | 1763                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4, 7, 8, 11-13, 15 and 21-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7, 8, 11-13, 15 and 21-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Terminal Disclaimer***

1. The terminal disclaimers filed on May 1, 2006 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of 10/281,079; 10/268,438; 6784096; 6974771; and 6916398 has been reviewed and is accepted. The terminal disclaimers are recorded.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 7 and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Jallepally, Ravi et al. (US 20030106490 A1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131. Jallepally teaches an apparatus (Figures 1-3) capable of performing multiple deposition processes, comprising: a chamber body (10; Figure 1); a lid (30; Figure 3) assembly attached to the chamber body (10; Figure 1); a first gas delivery sub-

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assembly (Figure 3) coupled to the lid (30; Figure 3) assembly and configured for a cyclical layer deposition process, comprising: a gas conduit (from 32a/34a through 13, Figure 3) in fluid communication with the chamber body (10; Figure 1) positioned on and extending through the lid (30; Figure 3) assembly; at least two flow paths (32a, 34a; Figure 3) in fluid communication with the gas conduit (from 32a/34a through 13, Figure 3), wherein each isolated flow path is coupled to one or more high speed actuating valves (32, 34; Figure 2) for enabling the cyclical layer deposition process (see above) comprising: a second gas delivery sub-assembly assembly (portion creating volume 36) coupled to the lid (30; Figure 3), an annular mixing channel (36; Figure 3) concentrically disposed about the gas conduit (from 32a/34a through 13, Figure 3) and in fluid communication with the gas conduit (from 32a/34a through 13, Figure 3) via one or more passageways, at least one nozzle (originating from 32a,34a; Figure 3 - Applicant equates “nozzles” with “passageways” - see Applicant’s specification section [0047]) connected to each of the one or more passageways and positioned to eject a gas into the gas conduit (from 32a/34a through 13, Figure 3); and a first gas inlet (32a; Figure 3) positioned on an inner wall of the annular mixing channel (36; Figure 3) to form a circular gas flow pattern for the gas within the annular mixing channel (36; Figure 3), as claimed by claim 7 – Applicant’s claimed limitation of “by a pressure differential created within the gas distribution assembly” is a claim requirement of intended use. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of

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performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02). Further, when the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Jallepally further teaches an apparatus (Figures 1-3) for performing multiple deposition processes, comprising: a substrate support (14; Figure 1) having a substrate receiving surface and contained within a chamber body (10; Figure 1); a lid (30; Figure 3) assembly attached to the chamber body (10; Figure 1); a process gas channel contained within a gas conduit (from 32a/34a through 13, Figure 3) positioned on and extending through the lid (30; Figure 3) assembly and having an expanding channel in fluid communication with the substrate support (14; Figure 1); a first gas delivery sub-assembly (Figure 3) coupled to the lid (30; Figure 3) assembly and configured for a cyclical layer deposition process, comprising: a first gas inlet (32a; Figure 3) and a second gas inlet (34a; Figure 3) positioned on the gas conduit (from 32a/34a through 13, Figure 3) to form a circular gas flow pattern within the process gas channel ; and a first high speed actuating valve (32; Figure 2) coupled to the first gas inlet (32a; Figure 3), a second high speed actuating valve (34; Figure 2) coupled to the second gas inlet (34a; Figure 3); the first and second high speed actuating valves are configured to enable sequential pulses of gases with a pulse time of about 1 second or less during the cyclical layer deposition process comprising: an annular mixing channel (36; Figure 3) in fluid communication with the substrate support (14; Figure 1) and adapted to deliver a continuous flow of one or more compounds into the process gas channel during the chemical vapor deposition process – claim 24. Jallepally

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further teaches a second gas delivery sub-assembly assembly (portion creating volume 36) coupled to the lid (30; Figure 3), as claimed by claim 24.

***Claim Rejections - 35 USC § 103***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1-4, 8, 11-13, 15, 21-23, and 25-30 are rejected under 35 U.S.C. 103(a) as being obvious over Jallepally, Ravi et al. (US 20030106490 A1) in view of Murakami; Takeshi et al. (US 5728223 A).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention “by another”; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2). Jallepally teaches an apparatus (Figures 1-3) capable of performing multiple deposition processes, comprising: a chamber body (10; Figure

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1); a lid (30; Figure 3) assembly attached to the chamber body (10; Figure 1); a first gas delivery sub-assembly (Figure 3) coupled to the lid (30; Figure 3) assembly and configured for a cyclical layer desposition process comprising: a gas conduit (from 32a/34a through 13, Figure 3) positioned on and extending through the lid (30; Figure 3) assembly in fluid communication with the chamber body (10; Figure 1); a first gas inlet (32a; Figure 3) and a second gas inlet (34a; Figure 3) positioned on the gas conduit (from 32a/34a through 13, Figure 3) to form a circular gas flow pattern within the gas conduit (from 32a/34a through 13, Figure 3); and a first high speed actuating valve (32; Figure 2) coupled to the first gas inlet (32a; Figure 3), a second high speed actuating valve (34; Figure 2) coupled to the second gas inlet (34a; Figure 3) and an annular mixing channel (36; Figure 3) in fluid communication with the gas conduit (from 32a/34a through 13, Figure 3), and adapted to deliver a continuous flow of one or more compounds into the gas conduit (from 32a/34a through 13, Figure 3) - claim 1

Applicant's claim requirement of "and configured for a cyclical layer desposition process", and "and the first and second high speed actuating valves are configured to sequentially pulse a first gas and a second gas during the cyclical layer deposition process:" are claim requirements of intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963);

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MPEP2111.02). When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Jallepally further teaches:

- i. Jallepally further teaches a second gas delivery sub-assembly assembly (portion creating volume 36) coupled to the lid (30; Figure 3), as claimed by claim 1, 7, and 24.
- ii. The apparatus (Figures 1-3) of claim 8, wherein the at least one nozzle (originating from 32a,34a; Figure 3 - Applicant equates “nozzles” with “passageways” - see Applicant’s specification section [0047]) is radially positioned or substantially radially positioned in relation to the gas conduit (from 32a/34a through 13, Figure 3), as claimed by claim 11
- iii. The apparatus (Figures 1-3) of claim 8, wherein the at least one nozzle (originating from 32a,34a; Figure 3 - Applicant equates “nozzles” with “passageways” - see Applicant’s specification section [0047]) is tangentially positioned or substantially tangentially positioned in relation to the gas conduit (from 32a/34a through 13, Figure 3), as claimed by claim 12
- iv. The apparatus (Figures 1-3) of claim 7, further comprising a second gas inlet (34a; Figure 3) positioned on an inner wall of the annular mixing channel (36; Figure 3), as claimed by claim 13
- v. The apparatus (Figures 1-3) of claim 24, wherein the annular mixing channel (36; Figure 3) is in fluid communication with the gas conduit (from 32a/34a through 13, Figure 3) by a plurality of passageways (plural 13) formed through a surface of the gas conduit (from 32a/34a through 13, Figure 3), as claimed by claim 27



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Jallepally does not teach

- vi. The apparatus (Figures 1-3) of claim 1, wherein the gas conduit (from 32a/34a through 13, Figure 3) comprises a gradually increasing inner diameter, as claimed by claim 2
- vii. The apparatus (Figures 1-3) of claim 1, wherein the gas conduit (from 32a/34a through 13, Figure 3) has a frusto-conical shape, as claimed by claim 3 – It is the Examiner's position that if a gas conduit has "a gradually increasing inner diameter", as claimed by claim 2, then it must be "a frusto-conical shape".
- viii. The apparatus (Figures 1-3) of claim 1, wherein the annular mixing channel (36; Figure 3) is in fluid communication with the gas conduit (from 32a/34a through 13, Figure 3) via one or more passageways, as claimed by claim 4
- ix. The apparatus (Figures 1-3) of claim 7, wherein the gas conduit (from 32a/34a through 13, Figure 3) further comprises a conical concave lower surface (See Figure 1, no label) to help evenly distribute gases within the chamber body (10; Figure 1), as claimed by claim 8
- x. The apparatus (Figures 1-3) of claim 7, wherein the gas conduit (from 32a/34a through 13, Figure 3) comprises a gradually increasing inner diameter from inlet to outlet, as claimed by claim 15
- xi. The apparatus (Figures 1-3) of claim 1, wherein the circular gas flow pattern is selected from the group consisting of a vortex pattern, a spiral pattern and a derivative thereof, as claimed by claim 21

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- xii. The apparatus (Figures 1-3) of claim 13, wherein the second gas inlet (34a; Figure 3) is positioned with the first gas inlet (32a; Figure 3) to form the circular gas flow pattern, as claimed by claim 22
- xiii. The apparatus (Figures 1-3) of claim 22, wherein the circular gas flow pattern is selected from the group consisting of a vortex pattern, a spiral pattern and a derivative thereof, as claimed by claim 23
- xiv. The apparatus (Figures 1-3) of claim 24, wherein the pulse time is about 0.1 seconds or less, as claimed by claim 25
- xv. The apparatus (Figures 1-3) of claim 25, wherein the circular gas flow pattern is selected from the group consisting of a vortex pattern, a spiral pattern and a derivative thereof, as claimed by claim 26
- xvi. The apparatus (Figures 1-3) of claim 27, wherein each passageway (13; Figure 3) of the plurality of passageways (13; Figure 3) contains a nozzle (originating from 13; Figure 3 - Applicant equates “nozzles” with “passageways” - see Applicant’s specification section [0047]) positioned to eject the one or more compounds into the process gas channel (outlet of 13), as claimed by claim 28
- xvii. The apparatus (Figures 1-3) of claim 28, wherein the nozzle (originating from 13; Figure 3 - Applicant equates “nozzles” with “passageways” - see Applicant’s specification section [0047]) is radially positioned or substantially radially positioned in relation to the gas conduit (from 32a/34a through 13, Figure 3), as claimed by claim 29
- xviii. The apparatus (Figures 1-3) of claim 28, wherein the nozzle (originating from 13; Figure 3 - Applicant equates “nozzles” with “passageways” - see Applicant’s specification

section [0047]) is tangentially positioned or substantially tangentially positioned in relation to the gas conduit (from 32a/34a through 13, Figure 3), as claimed by claim 30 Jallepally does not teach an expanding channel, further, Jallepally does not appear to teach an apparatus capable of creating a circular/vortex flow pattern. However, gas turbulence in the form of eddies reads on Applicant's circular/vortex flow pattern.

Murakami teaches an expanding channel (27; Figure 2) for gas distribution.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the dimensions of Jallepally's apparatus as taught by Murakami.

Motivation to optimize the dimensions of Jallepally's apparatus as taught by Murakami is for injecting process gases at uniform concentration and composition as taught by Jallepally (column 2; lines 25-30).

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 1-4, 7, 8, 11-13, 15, and 21-30 have been considered but are moot in view of the new grounds of rejection.

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner

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can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

*Parviz Hassanzadeh*  
5/22/16